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Highly absorbing metal nanolaminates for THz bi-material detectors¹ DRAGOSLAV GRBOVIC, FABIO ALVES, APOSTOLOS KARAMITROS, GAMANI KARUNASIRI, Naval Postgraduate School — Interest in THz-ray sensing has significantly increased in recent years. It has been demonstrated that bi-material MEMS detectors show a great potential to be used for THz imaging. Our work aims to identify metal nanolaminates to improve the detector absorption in the range of interest. Using a finite element simulation tools we demonstrate that Chromium and Nickel films can absorb up to 50 and 35%, respectively, between 1 and 5 THz, depending on the thickness of the layer. Different thickness of Cr and Ni layers were deposited on Si substrate using e-beam evaporation and the wafers were characterized using a FTIR expanded to THz range. The experimental results show excellent match with the simulations. Further analysis shows that by decreasing the surface filling fill-factor of Ni, it is possible to increase absorption closeup to the values obtained for the Cr films indicating that much lower stress Ni films can be used in bi-material MEMS detectors with absorption comparable with Cr films.

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